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June 25, 2012

Re: Draft Cease and Desist Order R5-2012-XXX for Clark Structural and Clark Pacific Corporation at the Former Spreckels Sugar Company Facility in Yolo Co.

To Whom It May Concern,

These comments are submitted as an interested party in the matter of the draft Cease and Desist Order R5-2012-XXX for Clark Structural and Clark Pacific Corporation (the "Dischargers") at the Former Spreckels Sugar Company Facility in Yolo Co.

In summary, I believe the draft order is insufficient in ensuring protection to humans, livestock, and the environment in the many ways. It is apparent that a unhealthy and/or hazardous condition exists at the site due to Discharger's failure to timely remove the PCC piles in a manner that is not harmful to nearby residents. It is Discharger's responsibility to lawfully operate under permits issued by both the Water Board and the YSAQMD. Discharger's failure to do so has resulted in continued ongoing exposures to toxic chemicals by the neighbors, their domestic animals, and to wildlife, and further contamination of the groundwater upon which their neighbors rely.

We request that the Water Board

1) Impose stiff penalties on Discharger for continued negligent operations
2) Require immediate tarping of all exposed PCC piles
3) Require that comprehensive Emission Reduction, Waste Management, and Waste Characterization Plans be implemented prior to any further PCC removal and that such removal proceed on an accelerated basis more quickly than is allowed under the proposed Cease and Desist Order
4) Require that groundwater contamination be completely characterized for all possible contaminants
5) Require that Discharger sample downgradient water quality on the Nelson Historic Ranch site to ensure that it meets all federal primary and secondary drinking water standards and to provide a new deep water well if existing water quality is inadequate

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More specifically,

1) Additional Extensive Testing of the Precipitated Calcium Carbonate (PCC) Contamination Should be Completed Before More Disturbance and Removal of the PCC to Prevent Offsite Contamination by Winds and Intentional Spreading on Other Agricultural Lands

2) In Addition to Imposing Severe Monetary Penalties for Intentional and Gross Disregard of the Permits Governing Their Activities, a Much Shorter Schedule for Removal of the PCC Should be Imposed or the Discharger is Rewarded for their Willful Negligence..

3) An Adequate Plan to Prevent Offsite Dust Emissions Should be Completed *BEFORE ANY* Additional PCC is Removed to Prevent Further Excessive Exposures of Nearby

Humans and Animals. Until such a Plan is Submitted and Approved, the Entire Amount of PCC Should be Immediately Tarped to Prevent Continued and Harmful Fugitive Dust Emissions from Adversely Impacting Neighbors Proven to Have Been Impacted by Discharger's Negligent Operations.

4) An Intensive and Immediate Surface Water Monitoring and Waste Runoff Management Program by Discharger Should be Required to Ensure that Additional Contamination of Public and Private Lands Does Not Occur

5) The Discharger Should Have the Current Onsite Groundwater Contamination Adequately Characterized and Remediated. Discharger Should also be Required to Test all Water Sources Downgradient of the Onsite Contaminated Plume to Ensure Compliance with all Existing Drinking Water Standards. Discharger should be Required to Provide a New Deep Water Well to the Affected Horse Ranch to the East if their Water Sources are Contaminated by the Discharger's Plume

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Further detailed information justifying each of the above recommendations follows:

1) Additional Extensive Testing of the Precipitated Calcium Carbonate (PCC) Contamination Should be Completed Before More Disturbance and Removal of the PCC to Prevent Offsite Contamination by Winds and Intentional Spreading on Other Agricultural Lands

There is and has been no required routine testing of the stockpiled contaminated PCC to guarantee that all of the PCC is not contaminated with heavy metals, ammonia, and/or other organic and inorganic contaminants. It appears that Staff is relying on analysis of only a few surface grab sample collected by the Discharger's agent to characterize the waste and deeper sections of the PCC pile has not been investigated at all.

There is ample reason to believe that there may be extensive contamination of some parts of the PCC pile and the soil underlying the waste pond underlying the PCC pile. For instance, the location on the property on which the PCC was stockpiled was an unlined pond into which many other types of industrial wastes were routinely deposited over the many years of operation of the sugar plant (from the mid 1930s to about 2000. These wastes included cooling tower blowdown which contained hexavalent chromium and zinc and many other water treatment chemicals. Additionally, lead acetate and asbestos were deposited in the same ponds as the PCC for many years. It is extremely unlikely that the PCC is not contaminated with one or more of these or other contaminants. It possibly included PCBs from oil–filled transformers that were manifested as moved to the site from many other Spreckels facilities over the years and subsequently stored on the site. Yet there is no record of their subsequent proper removal from the site and disposal.

Many of the descriptions of the PCC in various documents over the years describe it in different ways including off-white, tan, and "dirt-colored" depending on where and when the PCC was sampled. If the material were almost pure calcium carbonate it should be uniformly white. The variations in color would seemingly indicate that a variety of impurities exist in the PCC.

Indeed, one recent sample of the PCC material that drifted onto the adjacent Historic Nelson Horse Ranch during PCC removal operations contained over 400 mg/kg ammonia and 32 mg/kg chromium. These values are far in excess of those reported by the Discharger when obtaining or reporting on the previous and existing PCC discharge/removal permits.

The degree of possible contamination of the site is evidenced by the fact that the entire site has been listed as a possible “Brownfield” site for future characterization by the EPA which characterization has not yet been performed.

Routine testing of the PCC must be required as new portions of the PCC pile are exposed to ensure that the PCC can be safely redistributed on agricultural lands without unknowing contamination of these farm properties and to minimize potential adverse exposures when the PCC drifts onto the adjacent Historic Nelson Horse Ranch or other nearby properties when disturbed for loading and removal. Failure to ensure an increased scrutiny and monitoring of the PCC for contamination could unknowingly cause spread of toxic chemicals to farm lands and similarly expose Discharger’s adjacent neighbors to the PPC-laden dust drift to which they have been negligently exposed.

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2) In Addition to Imposing Severe Monetary Penalties for Intentional and Gross Disregard of the Permits Governing Their Activities, a Much Shorter and More Carefully Monitored Schedule for Removal of the PCC Should be Imposed or the Discharger is Rewarded for their Willful Negligence.

This Cease and Desist order is proposed because the Dischargers, either intentionally or unintentionally, grossly misjudged and underestimated the amount of PCC on the property <u>and/or</u> grossly overreported the amount of PCC that have been removed from the property on an annual basis.

The Discharger has already been granted one 5-year extension for removal of all of the PCC yet the majority of the initial amount of PCC is still on site after 10 years. The extended schedule offered for removal of the PCC essentially rewards the Dischargers for this overt negligence by not imposing more severe remedies including substantial fines.

Further, the extended time period for the Discharger to complete removal is far too long in that it needlessly subjects the already impacted and sensitized neighbors and their animals to additional years of exposure to extensive wind-borne particulates blowing from the disturbed, contamiinated PCC pile. Further, as discussed below, extension of the removal time allowed for the PCC increases continued ongoing groundwater contamination which will be shown later herein to be grossly excessive and undoubtedly due to leaching from the PCC piles.

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3) An Adequate Plan to Prevent Offsite Dust Emissions Should be Completed <u>*BEFORE ANY*</u> Additional PCC is Removed to Prevent Further Excessive Exposures of Nearby Humans and Animals. Until such a Plan is Submitted and Approved, the Entire Amount of PCC Should be Immediately Tarped to Prevent Continued and Harmful Fugitive Dust Emissions from Adversely Impacting Neighbors Proven to Have Been Harmed by Discharger’s Negligent Operations.

Potentially sensitive neighbors living nearby include a home for mentally disabled adults, an organic vegetable ranch, and a horse and cattle ranch. There have been numerous demonstrated adverse health reactions by humans and cattle and horses as reported by Discharger’s neighbors when the wind blows the disturbed PCC in their direction. These have required medical and veterinarian intervention for respiratory tract inflammation and distress and skin and eye irritations and allergic reactions. This has required extensive medical and veterinarian care and treatment over the past several years which treatments are directly correlated with increased PCC removal activity by Discharger and reported complaints by neighbors.

I have personally experienced the adverse health and physical effects of this PCC drift when I visited the ranch to the east of the property on May 2, 2010. When I arrived that morning, there was a continuous plume of dust rising from the PCC pile which worsened every time a wind gust occurred. I personally observed this dust depositing over the entire exterior of my car by the time I left after only about 2 hours at the site. Indeed, my car turned from its normal silver grey color to a dirty tan color with one hour and up to 1 mm of the dust could be scraped off the car hood on the downwind side by the time I left. This dust was apparent throughout the ranch's barns and stalls and even covered all the walls and furniture surfaces in their home. At that time, the owner of the ranch had visible swelling in her face and arms and had reddened, weeping eyes. I also observed cattle and horses with copious mucous discharges from the noses and could see a similar accumulation of this fugitive dust in their ears and corners of their eyes. Some had visible rashes on their hides.

Within ½ hour of going onsite and being directly exposed to the blowing PCC dust, I began feeling a burning sensation in my nose and had stinging eyes. Within an hour of arriving on the site and after closely inspecting the visible plume of dust blowing from the PCC piles directly in front of the neighbor's barn, I was coughing could beat my clothes with my hands and the dust would rise from them. I left after about two hours and changed my clothes and showered immediately after driving from the ranch to my Davis home. Yet that evening, I had an unmistable rash covering portions of my arms and face. I took an antihistamine which mostly alleviated the symptoms by the next morning although I was still removing a chalky brown substance from my nostrils until mid-day. Quite honestly, I could not imagine living under these conditions and it is clearly adversely affecting the health and welfare of the property owner and animals on the ranch.

These symptoms experienced by me and reported by the ranch owners to the Dischargers are completely consistent with adverse exposures as noted on the MSDS for PCC. Knowing this, the Dischargers have repeatedly shown a wanton disregard for the health and safety of these downwind neighbors by not following agreed-upon procedures under their permit to safely move the PCC granted by the Yolo-Solano Air Quality Management District (YSAQMD).

For instance, during 2008 and 2009 alone, over a dozen complaints were lodged with the YSAQMD regarding fugitive particulate emissions resulting from removal of the PCC by Discharger's trucking contractor. These violations resulted in a number of $10,000 fines. During discussions regarding these penalties with the YSAQMD, the trucking firm acknowledged that they had removed the sprinkler system which was a previously required and integral part of their dust control system as specified in their YSAQMD permit. This sprinkler system was required by the YSAQMD as far back as 1999 as was to have been operated twice per day to maintain a ½ inch crust on the PCC pile or more if required for adequate dust suppression. This sprinkler system has never been reinstalled despite still being a required part of their permit to remove the PCC

Until recently, the fugitive emissions were only arising from portions of the PCC pile which had been recently disturbed by moving operations. The problem with fugitive emissions has very much worsened recently, however, because the Discharger has completely broke down and disrupted all the hills of PCC that had remained covered with grass and vegetation for more than a decade and moved it into several new piles. This has loosened all of the previously compacted PCC which makes it far easier to be wind-borne. Also, all removal of PCC was previously done from the center of a massive PCC pile and surrounded by 20 foot compacted PCC berms which somewhat helped to minimize drift emissions. Unfortunately, all these original, partially stable PCC piles have now been disrupted and spread far apart which loose piles have greatly exacerbated the problem of fugitive emissions. Hills and mounds that were across the site away from the ranch are being relocated just across from the main barn, show arena, and spectator seating. The other mounds have been sheered off and the lime walls are left exposed to wind which carries airborne PCC directly toward a community garden that is used by both children and developmentally disabled adults and that has provided tons of food to the local community each year.

Finally, the Discharger has been in repeated violation of the YSAQMD Permit which requires the Discharger to be in compliance with the following YSAQMD rule specifically incorporated into their permits, "*A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public or which endanger the comfort, repose, health, or safety of any such persons or the public or which cause to have a natural tendency to cause injury or damage to business or property*."

This is a very clear and unequivocal requirement of their permit and it has been grossly and repeatedly violated.

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4) An Intensive and Immediate Surface Water Monitoring and Waste Runoff Management Program by Discharger Should be Required to Ensure that Additional Contamination of Public and Private Lands Does Not Occur

A previous WDR by Water Board in 1996 required a Waste Management Unit (WMU) to be installed to contain any runoff from the PCC waste. Such a WMU has never been installed despite the fact that the PCC were characterized as a "designated waste" by the Water Board in 2000.

In 2008, the Water Board required Clark Pacific to submit a mitigation measure providing for "Standard procedures to dispose of contained run-off water". Such mitigation measures were obviously never implemented because one runoff sample collected on Discharger's eastern property line in showed a Biological Oxygen Demand of 140 mg/kg and a Chemical Oxygen Demand of 3,700 mg/kg. Clearly this indicated a severe surface water contamination problem emanating from Discharger's site which must be properly characterized and remediated beginning with having a proper WMU plan immediately submitted to the Water Board for approval and installation.

Additionally, as noted by the YSAQMD and observed by the Water Board, Discharger has been repeatedly leaving PCC dust on county roads and in adjacent ditches which has been documented as far back as 2004 by the YSAQMD and continues to date in direct violation of the previous WDRs issued by the Water Board.

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5) The Discharger Should Have the Current Onsite Groundwater Contamination Adequately Characterized and Remediated. Discharger Should also be Required to Test all Water Sources Downgradient of the Onsite Contaminated Plume to Ensure Compliance with all Existing Drinking Water Standards. Discharger should be Required to Provide a New Deep Water Well to the Affected Horse Ranch to the East if their Water Sources are Contaminated by the Discharger's Plume

A very serious and uncharacterized groundwater contamination plume exists at the site based on the Dischargers own semi-annual water quality analyses of samples taken from monitoring wells on the site and submitted to the Water Board. This has resulted in contamination of groundwater that is well in excess of drinking water standards for some parameters by neighbors down gradient in the plume. The Discharger should be required to implement all efforts at remediation of this contaminated plume and provide a deep water well to the horse ranch so affected to ensure they have access to safe sources of water.

The following discussion describes the extent of this contamination as evidenced from monitoring well samples

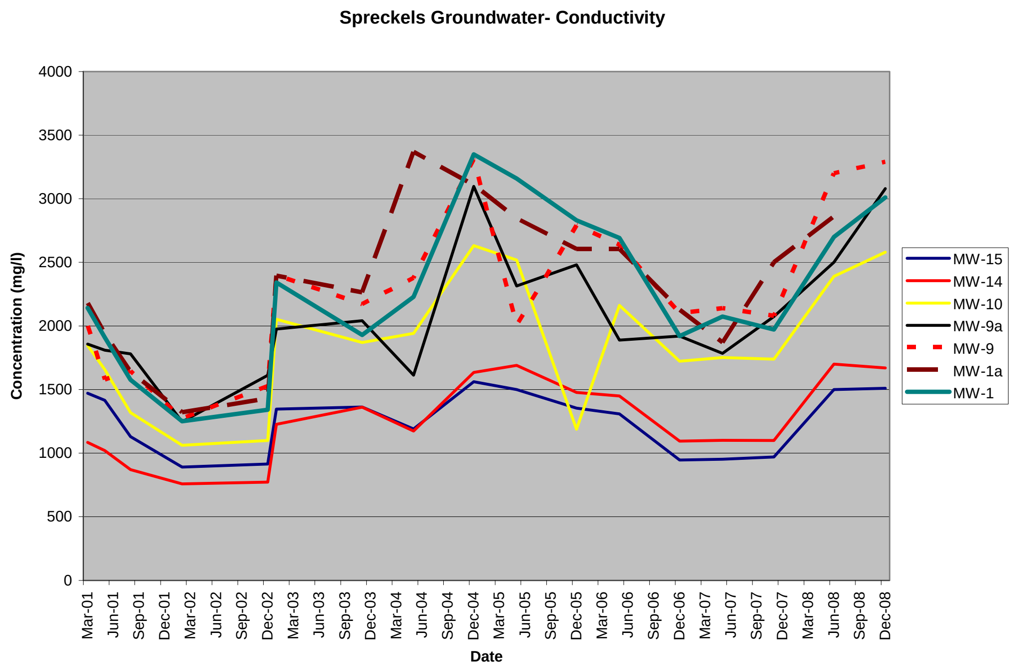
Well Locations - The following photo shows the locations of the monitoring wells from which samples were taken by Discharger.

Well 14 and 15 are those on the upper northwest corner of the property and are considered by the Water Board to be "reference" wells (i.e. those unaffected by the plant's operations) because they are upgradient from the direction of groundwater flow. The groundwater generally flows towards the east, northeast, or southeast (depending on when it was measured in the past) under the plant then under the calcium carbonate piles then under the horse ranch and the UC property to the north of the horse ranch. Wells 1, 1a, 9, 9a, and 10 are all situated on the northeast boundary of the former plant site and represent increased concentrations of contaminants in the groundwater that presumably could only have been added by plant activities.

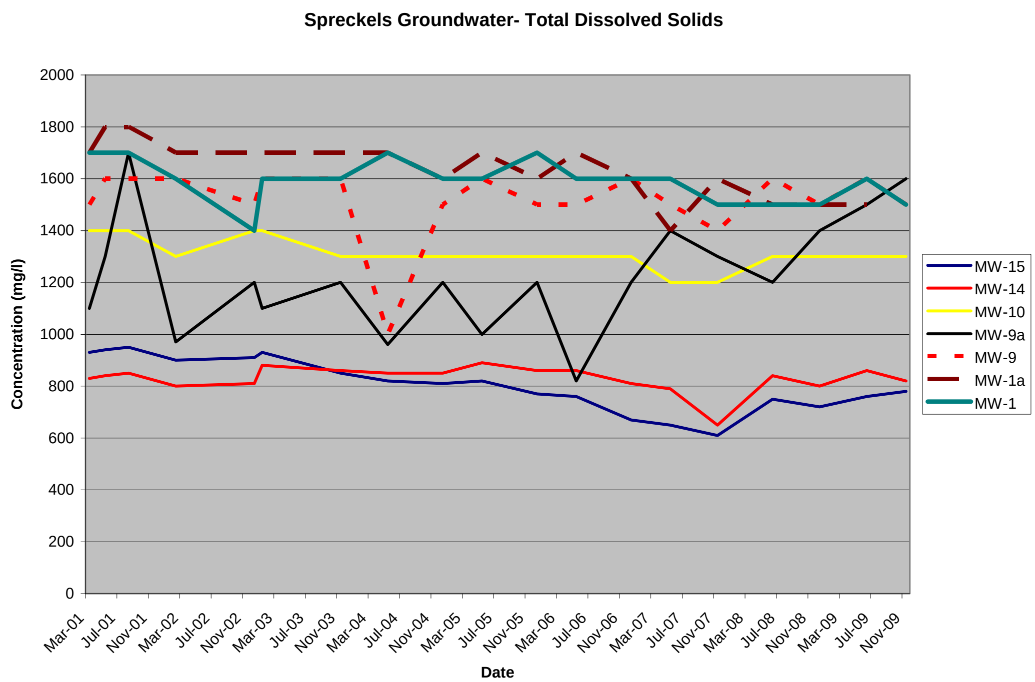
Groundwater Concentrations

For every constituent shown on the graphs below (and as reported in Appendix A), the wells to the east of the plant (i.e. on the eastern border between the plant and properties to the east) are substantially higher than the reference wells in the northwest corner of the plant indicating that these constituents are added to the groundwater as it flows under the plant.

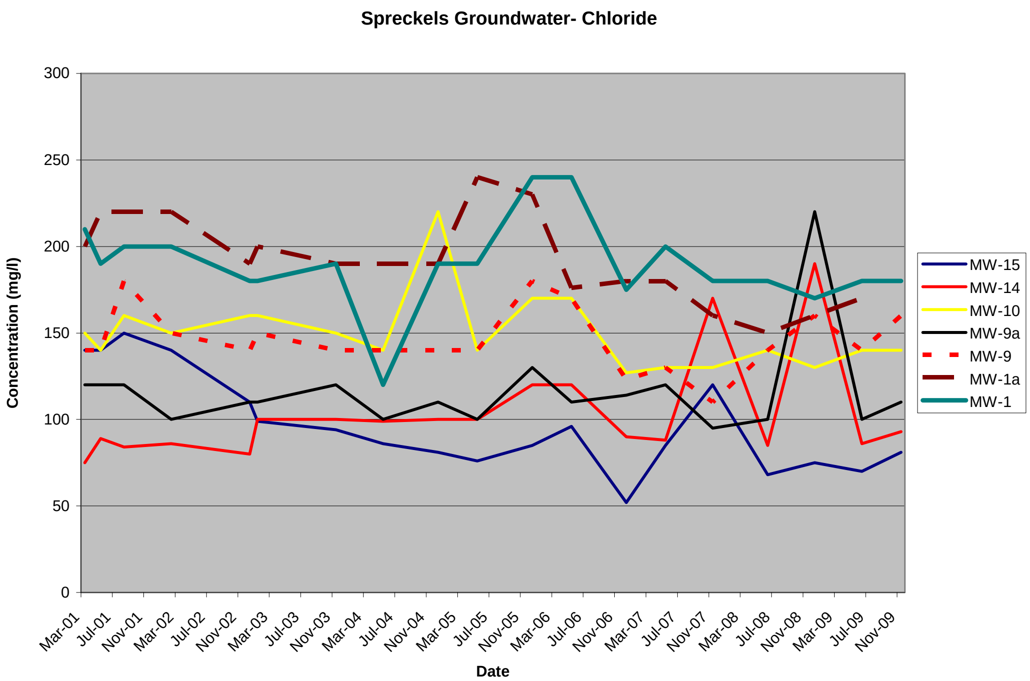
Electrical Conductance (or Conductivity) is a general measure of the amount of electrically conductive salts in the water. There is a federal drinking water standard of 1,600 micromhos/cm which is easily exceeded by the wells to the east. The charts show that reference wells (solid red and dark blue lines on all charts) are just at or below the federal standard clearly indicating the plant as the source of the increase in groundwater conductivity to above federal standards.



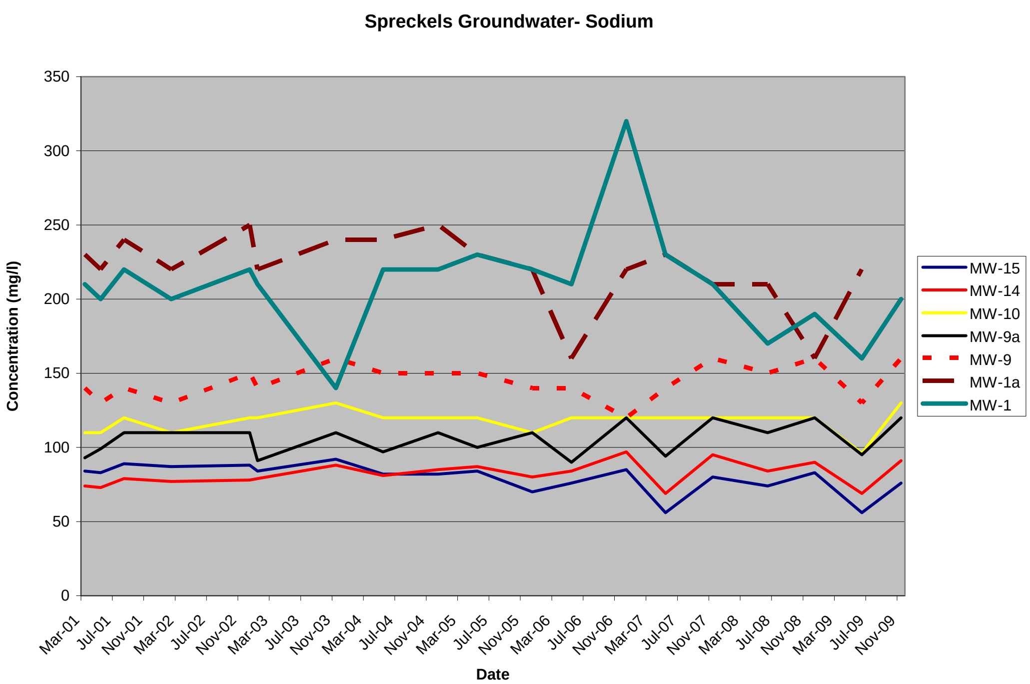
Total Dissolved Solids (or TDS) is another measure of how much total solids (organic and inorganic) are dissolved in the groundwater. There is a federal drinking water limit of 1,000 milligrams per liter (or mg/l = parts per million = ppm). Both reference wells are well below the standard while all eastern wells are well above the standard.



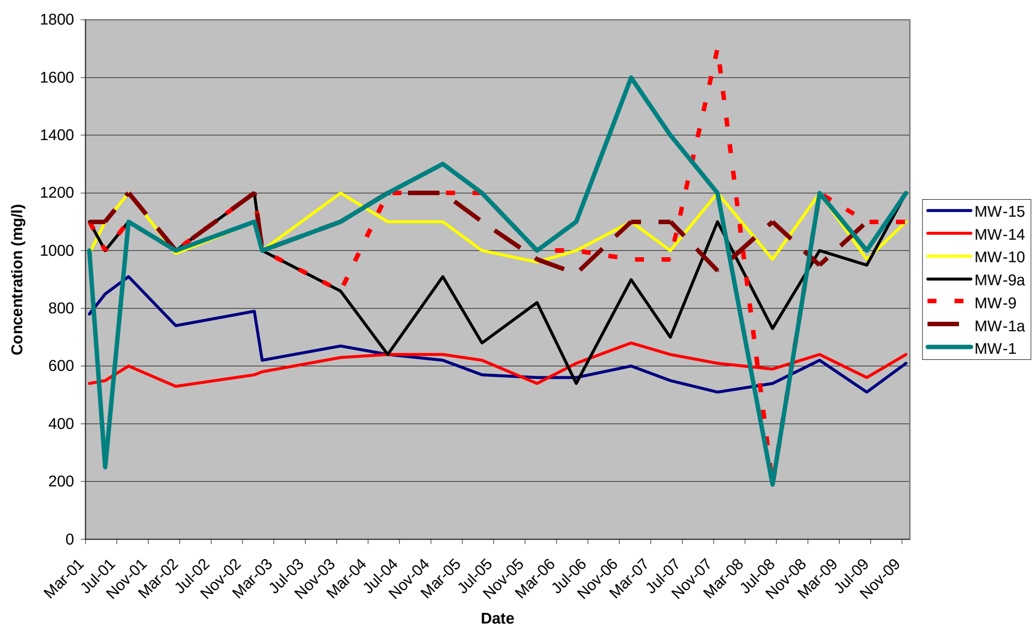
<u>Chloride</u> has a federal drinking water standard of 500 mg/l and both the reference wells and eastern wells are well below this limit. However, the eastern wells show a consistently higher concentration of chlorides than the reference wells indicating a substantial amount of chlorides are being added to the groundwater as a result of it passing through the plant underground.



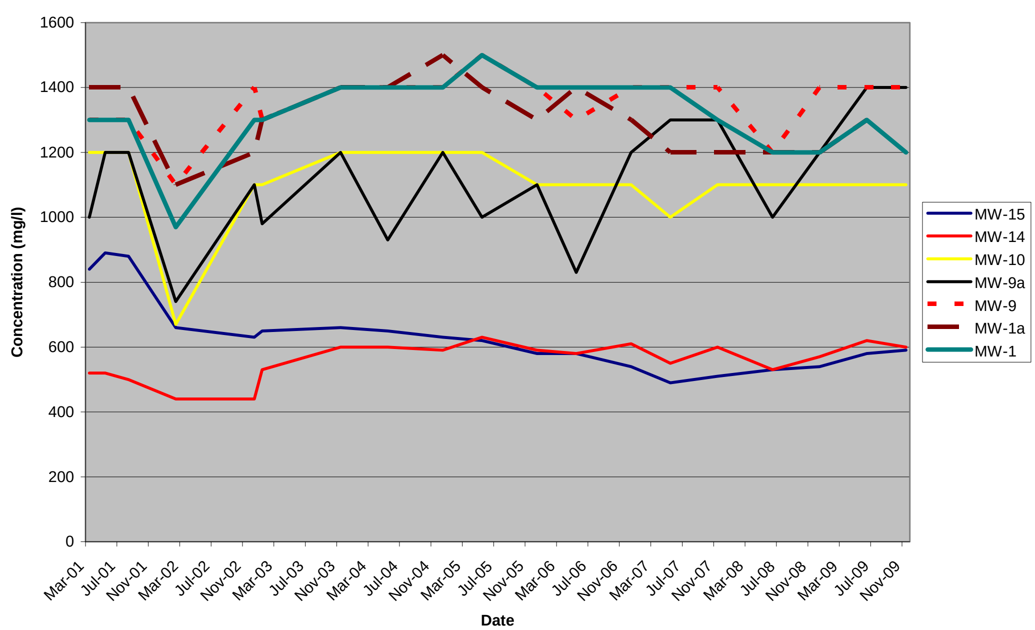
<u>Sodium</u>, <u>hardness</u> (calcium and magnesium carbonate), and <u>alkalinity</u> (bicarbonate and carbonate) do not have drinking water standards but all eastern wells are well in excess of the reference well.



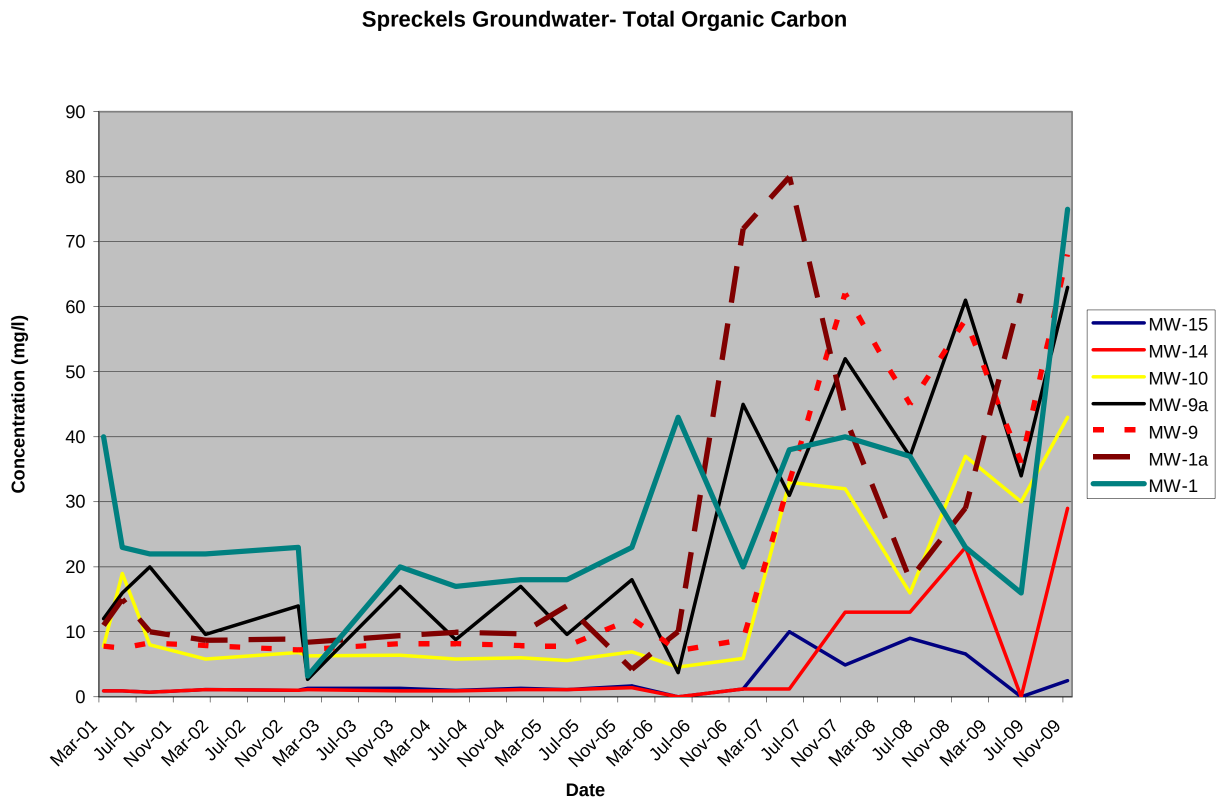
Spreckels Groundwater- Hardness as CaCO3



Spreckels Groundwater- Alkalinity



Total Organic Carbon (TOC) also does not have a federal drinking water standard but there is again a clear pattern of TOC increasing on the easternmost test wells indicating that the plant added TOC to the groundwater.



TOC can include anything of including hydrocarbon materials including oils, diesel and gas known known to have leaked on the site. It could also possibly include PCB-laden transformer oil which was previously stored on the site with no record of its proper removal and remediation. Other sources of hydrocarbon contamination are solvents used on the site and disposed of in the waste ponds, sugar beet juice, and/or other sources of decomposing biomass.

It is premature to speculate as to the nature of this TOC but it is imperative that this is determined because it may include any number of harmful organic materials and/or toxic byproducts of organic decomposition in the soil. For instance, at one point elevated levels of formaldehyde were detected in the groundwater at the plant. It was argued by the former operators of the plant that the formaldehyde was due to natural organic decomposition in the soil and not to the paraformaldehyde the plant was using in their operations and disposing in the waste ponds. They thus claimed that they should not be held responsible for naturally-occurring processes. Either way, a toxic hydrocarbon chemical was shown to be leaching into the groundwater and it is essential that the entire TOC contamination be further characterized to ensure the safety of the groundwater plume

<u>Conclusions of Groundwater Monitoring Results</u>

Groundwater contamination is clearly increasing in concentration in a variety of minerals, salts, and organic materials as it migrates through the old plant site to the extent that it is now unsuitable for drinking water. Further, the high levels of salts in the groundwater are likely the primary contributing factor to the slow death of the trees observed over the last 6 years on the property line between the Discharger and the horse ranch to the east of the plant. The increases in groundwater contamination are not just seen in hardness, alkalinity, conductivity, and TDS expected because of the huge amounts of calcium carbonate from the piles leaching into the shallow groundwater. Increases in groundwater contaminants are also seen in sodium, chloride, and TOC indicating other constituents other than just purecalcium carbonate are also leaching into the groundwater.

Much more needs to be done to characterize the other materials in this water to determine if the plume also exceeds other drinking water standards under neighboring properties or if it contains any toxic organic or chlorinated organic chemicals that pose a risk to wildlife or humans.

In summary, it is apparent that a unhealthy and/or hazardous condition exists at the site due to Discharger's failure to timely remove the PCC piles in a manner that is not harmful to nearby residents. It is Discharger's responsibility to lawfully operate under permits issued by both the Water Board and the YSAQMD. Discharger's failure to do so has resulted in continued ongoing exposures to toxic chemicals by the neighbors and further contamination of the groundwater upon which their neighbors rely.

We request that the Water Board

1) Impose stiff penalties on Discharger for continued negligent operations
2) Require immediate tarping of all exposed PCC piles
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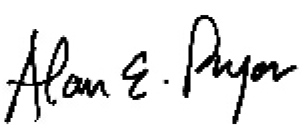
4) Require that groundwater contamination be completely characterized for all possible contaminants
5) Require that Discharger sample downgradient water quality on the Nelson Historic Ranch site to ensure that it meets all federal primary and secondary drinking water standards and to provide a new deep water well if existing water quality is inadequate

Please feel free to contact me if you have any questions about or desire clarification or documentation of any of the information or statements herein or wish for any further information.

Respectfully Submitted



Alan Pryor
President

Appendix A

Well	Date Sampled	PH	Conductivity	Turbidity	Ammonia as Nitrogen	Total Alkalinity	CaC03	Calcium	Chloride	Hardness Cac03	Nitrate	Sodium	TDS	TFDS	
MW-15	Mar-01	7.45	1471	34.8	nd	840	840	60	140	780	5.6	84	930	630	0.9
	May-01	7.18	1416	na	nd	890	890	62	140	850	nd	83	940	600	0.9
	Aug-01	7.41	1130	65.2	nd	880	880	60	150	910	6	89	950	610	0.7
	Feb-02	6.99	890	14	nd	660	660	68	140	740	7.4	87	900	480	1.1
	Dec-02	7.32	915	12	nd	630	630	65	110	790	7.5	88	910	600	1
	Jan-03	7.86	1346	12	nd	650	650	68	99	620	7	84	930	670	1.3
	Nov-03	7.71	1363	13	nd	660	660	72	94	670	7.2	92	850	600	1.3
	May-04	7.47	1190	10	nd	650	650	74	86	640	7.2	82	820	580	0.97
	Dec-04	7.65	1561	5	nd	630	630	69	81	620	8.1	82	810	580	1.3
	May-05	7.22	1500	50	nd	620	620	64	76	570	7.9	84	820	580	1.1
	Dec-05	8.59	1354	90.81	nd	580	580	58	85	560	44	70	770	620	1.7
	May-06	7.82	1308	170	nd	580	580	62	96	560	39	76	760	660	nd
	Dec-06	7.77	946	615.8	nd	540	540	59	52	600	35	85	670	800	1.2
	May-07	7.82	953	57.66	nd	490	490	63	85	550	36	56	650	730	10
	Nov-07	7.8	970	16	nd	510	510	41	120	510	46	80	610	520	4.9
	Jun-08	7.85	1500	29.1	<.10	530	530	64	68	540	10	74	750	560	9
	Dec-08	7.33	1510	48.2	<.10	540	540	65	75	620	11	83	720	580	6.6
	Jun-09	mnt	mnt	mnt	<.10	580	580	56	70	510	12	56	760	570	,10
	Nov-09	7.31	mnt	mnt	<.10	590	590	64	81	610	10	76	780	600	2.5
Primary MCL		xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	10	xxx	xxx	xxx		
Secondary MCL			6.5 - 8.5	xxx	xxx	xxx	xxx	xxx	250	xxx	xxx	xxx	500	xxx	
Well	Date Sampled	PH	Conductivity	Turbidity	Ammonia as Nitrogen	Total Alkalinity	CaC03	Calcium	Chloride	Hardness Cac03	Nitrate	Sodium	TDS	TFDS	Total Organic Carbon
MW-14	Mar-01	7.79	1084	na	nd	520	520	80	75	540	13	74	830	630	0.9
	May-01	7.56	1020	na	nd	520	520	82	89	550	13	73	840	600	0.9

	Aug-01	7.55	870	5.2	nd	500	500	90	84	600	15	79	850	610	0.7
	Feb-02	6.29	758	9	nd	440	440	78	86	530	15	77	800	480	1.1
	Dec-02	7.64	773	10	nd	440	440	85	80	570	15	78	810	600	1
	Jan-03	7.91	1227	10	nd	530	530	83	100	580	17	79	880	650	1.1
	Nov-03	7.84	1361	10	nd	600	600	90	100	630	14	88	860	620	0.9
	May-04	7.05	1175	7	nd	600	600	96	99	640	13	81	850	600	0.92
	Dec-04	7.64	1635	4	nd	590	590	92	100	640	13	85	850	640	1.1
	May-05	7.2	1690	63	nd	630	630	90	100	620	12	87	890	640	1.1
	Dec-05	8.48	1477	29.07	nd	590	590	58	120	540	67	80	860	660	1.4
	May-06	7.82	1450	20.9	nd	580	580	89	120	610	54	84	860	720	nd
	Dec-06	7.71	1095	175	nd	610	610	89	90	680	45	97	810	740	1.2
	May-07	7.88	1102	57.66	nd	550	550	90	88	640	48	69	790	690	1.2
	Nov-07	7.83	1100	5	nd	600	600	61	170	610	52	95	650	620	13
	Jun-08	7.23	1700	21	<.10	530	530	89	85	590	12	84	840	650	13
	Dec-08	7.34	1670	6.9	0.13	570	570	89	190	640	11	90	800	660	23
	Jun-09	mnt	mnt	mnt	<.10	620	620	81	86	560	10	69	860	680	,10
	Nov-09	7.38	mnt	mnt	<.10	600	600	89	93	640	11	91	820	660	29
Well	Date Sampled	PH	Conductivity	Turbidity	Ammonia as Nitrogen	Total Alkalinity	CaC03	Calcium	Chloride	Hardness Cac03	Nitrate	Sodium	TDS	TFDS	Total Organic Carbon
MW-13	Mar-01	7.44	1437	5.5	nd	840	840	98	160	780	nd	92	1200	800	1.8
	May-01	7.18	1198	na	nd	760	890	97	150	770	5.3	94	1200	890	1.1
	Aug-01	7.41	1054	7.2	nd	660	880	100	140	850	26	90	1200	810	1.7
	Feb-02	6.99	891	12	nd	520	660	91	150	740	26	92	1200	860	1.7
	Dec-02	7.32	961	7	nd	670	630	98	150	780	27	94	1200	800	1.8
	Jan-03	7.7	1583	8	nd	660	660	98	160	780	23	94	1200	790	1.4
	Nov-03	7.56	1741	4	nd	710	710	110	160	890	28	110	1200	780	1.3
	May-04	6.97	1601	7	nd	720	720	120	160	880	25	96	1100	800	1.1
	Dec-04	7.47	2130	5	nd	710	710	110	160	850	25	100	1100	760	1.3
	May-05	7.11	2140	7	nd	720	720	110	170	850	27	100	1100	830	1.4
	Dec-05	8.44	1926	52.1	nd	670	670	74	200	760	150	95	1100	920	2.1
	May-06	7.55	1837	34.5	nd	640	640	100	190	780	140	95	1100	990	1.1
	Dec-06	7.5	1397	10.1	nd	660	660	110	146	890	115	110	1200	1200	1.3

	May-07	7.61	1451	31.59	nd	620	620	110	120	850	120	94	1100	1100	11
	Nov-07	7.58	1421	14	nd	650	650	78	150	810	97	110	1990	1990	26
	Jun-08	not sampled													
	Dec-08	not sampled													
	Jun-09	not sampled													
	Nov-09	not sampled													
Well	Date Sampled	PH	Conductivity	Turbidity	Ammonia as Nitrogen	Total Alkalinity	CaC03	Calcium	Chloride	Hardness Cac03	Nitrate	Sodium	TDS	TFDS	Total Organic Carbon
MW-11 Shallow	Mar-01	7.3	1648	10.3	1	890	890	98	120	820	13	140	1200	900	2.8
	May-01	7.16	1417	na	nd	850	850	97	120	780	13	130	1200	890	3.1
	Aug-01	7.34	1231	7.8	nd	840	840	100	120	830	15	140	1200	900	2.7
	Feb-02	6.93	1032	28	nd	690	690	91	140	760	15	140	1200	910	2.8
	Dec-02	7.26	1061	18	1	820	820	98	120	820	15	140	1200	960	2.7
	Jan-03	7.67	1750	19	nd	820	820	93	140	770	17	130	1200	870	2.6
	Nov-03	7.56	1942	15.1	nd	890	890	100	130	830	14	140	1200	830	0.2
	May-04	6.5	1659	8	nd	900	900	100	130	830	14	140	1100	840	3.1
	Dec-04	7.54	2349	5	nd	880	880	100	130	830	16	130	1200	870	3
	May-05	7.02	2312	6	nd	910	910	100	130	830	16	130	1200	860	2.8
	Dec-05	8.41	1085	30.87	0.42	850	850	94	160	810	87	130	1200	950	3.8
	May-06	7.61	1093	35	0.47	860	860	90	160	760	70	130	1200	1000	2.3
	Dec-06	7.41	1518	11.6	nd	820	820	96	110	860	64	150	1100	1000	2.7
	May-07	7.54	1553	7	nd	720	720	120	120	880	76	110	1200	1000	30
	Nov-07	7.5	1509	8	nd	780	780	73	130	800	85	130	1100	880	22
	Jun-08	not sampled													
	Dec-08	not sampled													
	Jun-09	not sampled													
	Nov-09	not sampled													
Well	Date	PH	Conductivity	Turbidity	Ammonia	Total	CaC03	Calcium	Chloride	Hardness	Nitrate	Sodium	TDS	TFDS	Total

	Sampled				as Nitrogen	Alkalinity				Cac03					Organic Carbon
MW-10 Shallow	Mar-01	7.46	1846	8.1	nd	1200	100	100	150	990	nd	110	1400	980	7.8
	May-01	7	1657	na	nd	1200	120	120	140	1100	33	110	1400	1000	19
	Aug-01	7.59	1319	8	nd	1200	120	120	160	1200	nd	120	1400	1100	8
	Feb-02	6.82	1062	9	nd	670	100	100	150	990	0.2	110	1300	920	5.8
	Dec-02	7.1	1100	8	nd	1100	120	120	160	1100	nd	120	1400	1000	6.8
	Jan-03	7.64	2053	8	nd	1100	110	110	160	1000	nd	120	1400	1000	6.3
	Nov-03	7.55	1870	4.8	nd	1200	120	120	150	1200	nd	130	1300	1300	6.4
	May-04	6.81	1942	14	nd	1200	110	110	140	1100	0.4	120	1300	940	5.8
	Dec-04	7.24	2632	7	nd	1200	110	110	220	1100	nd	120	1300	1000	6
	May-05	6.97	2518	7	nd	1200	110	110	140	1000	nd	120	1300	960	5.6
	Dec-05	8.23	1187	25	nd	1100	72	72	170	960	1.2	110	1300	1000	6.9
	May-06	7.52	2162	9-Oct	nd	1100	110	110	170	1000	1.1	120	1300	1100	4.6
	Dec-06	7.48	1723	44.1	nd	1100	110	110	127	1100	nd	120	1300	1200	5.9
	May-07	7.4	1752	14.1	nd	1000	100	100	130	1000	nd	120	1200	1100	33
	Nov-07	7.43	1739	7	nd	1100	81	81	130	1200	nd	120	1200	990	32
	Jun-08	7.28	2390	13	<.1	1100	100	100	140	970	<.5	120	1300	970	16
	Dec-08	7	2580	0	<.1	1100	120	120	130	1200	<.5	120	1300	1000	37
	Jun-09	mnt	mnt	mnt	<.1	1100	100	100	140	970	<.5	96	1300	950	30
	Nov-09	7.34	mnt	mnt	0.11	1100	110	110	140	1100	<.5	130	1300	950	43
Well	Date Sampled	PH	Conductivity	Turbidity	Ammonia as Nitrogen	Total Alkalinity	CaC03	Calcium	Chloride	Hardness Cac03	Nitrate	Sodium	TDS	TFDS	Total Organic Carbon
MW-9a Shallow	Mar-01	7.4	1857	7.3	78	1000	1000	38	120	1100	nd	93	1100	840	12
	May-01	7.16	1810	na	28	1200	1200	49	120	1000	nd	99	1300	910	16
	Aug-01	7.24	1780	8.8	54	1200	1200	55	120	1100	nd	110	1700	2200	20
	Feb-02	7.2	1247	18	50	740	740	33	100	1000	nd	110	970	700	9.6
	Dec-02	7.33	1611	28	76	1100	1100	50	110	1200	nd	110	1200	930	14
	Jan-03	7.6	1976	10	44	980	980	37	110	1000	nd	91	1100	730	2.7
	Nov-03	7.62	2042	7.1	40	1200	1200	49	120	860	nd	110	1200	800	17
	May-04	7.3	1613	5	37	930	930	40	100	640	0.4	97	960	700	8.8

	Dec-04	7.08	3097	5	64	1200	1200	51	110	910	nd	110	1200	900	17
	May-05	7.17	2315	8	50	1000	1000	42	100	680	nd	100	1000	720	9.6
	Dec-05	8.48	2480	35.11	49	1100	1100	49	130	820	nd	110	1200	1000	18
	May-06	7.71	1888	9.6	35	830	830	36	110	540	nd	90	820	870	3.7
	Dec-06	7.4	1920	12	nd	1200	1200	49	114	900	nd	120	1200	1100	45
	May-07	7.35	1785	5.29	nd	1300	1300	33	120	700	1.1	94	1400	880	31
	Nov-07	7.46	2075	5	nd	1300	1300	43	95	1100	1.6	120	1300	960	52
	Jun-08	6.89	2500	5	46	1000	1000	46	100	730	<.5	110	1200	840	37
	Dec-08	7.1	3080	-1	52	1200	1200	55	220	1000	<.5	120	1400	1000	61
	Jun-09	mnt	mnt	mnt	57	1400	1400	51	100	950	<.5	95	1500	1100	34
	Nov-09	7.03	mnt	mnt	56	1400	1400	62	110	1200	<.5	120	1600	1100	63
Well	Date Sampled	PH	Conductivity	Turbidity	Ammonia as Nitrogen	Total Alkalinity	CaC03	Calcium	Chloride	Hardness Cac03	Nitrate	Sodium	TDS	TFDS	Total Organic Carbon
MW-1 Shallow	Mar-01	7.34	2000	15.7	34	1300	1300	96	140	1100	nd	140	1500	1100	7.8
	May-01	7.06	1578	na	12	1300	1300	95	140	1000	nd	130	1600	1200	7.5
	Aug-01	7.16	1646	4.5	18	1300	1300	100	180	1100	nd	140	1600	1200	8.3
	Feb-02	6.95	1275	7	21	1100	1100	94	150	1000	nd	130	1600	1200	7.9
	Dec-02	7.23	1529	9	20	1400	1400	100	140	1200	nd	150	1500	1200	7.2
	Jan-03	7.47	2399	27	14	1300	1300	92	150	1000	nd	140	1600	1200	7.3
	Nov-03	7.44	2171	7	nd	1400	1400	100	140	860	nd	160	1600	1100	8.2
	May-04	6.89	2377	9	15	1400	1400	110	140	1200	0.7	150	1000	1000	8.2
	Dec-04	6.96	3308	5	86	1400	1400	100	140	1200	nd	150	1500	1200	7.9
	May-05	6.99	2006	10	18	1500	1500	110	140	1200	nd	150	1600	1100	7.8
	Dec-05	8.42	2792	33.14	19	1400	1400	55	180	1000	1	140	1500	1300	12
	May-06	7.6	2638	14.2	19	1300	1300	95	170	1000	0.8	140	1500	1400	7.1
	Dec-06	7.2	2102	15	nd	1400	1400	10	123	970	nd	120	1600	1500	8.8
	May-07	7.15	2140	12.28	nd	1400	1400	57	130	970	1.2	140	1500	1400	33
	Nov-07	7.44	2080	6	nd	1400	1400	71	110	1700	nd	160	1400	1200	62
	Jun-08	7.01	3200	4	15	1200	1200	100	140	190	<.5	150	1600	1200	45
	Dec-08	6.93	3290	1.1	22	1400	1400	100	160	1200	<.5	160	1500	1200	58
	Jun-09	mnt	mnt	mnt	18	1400	1400	97	140	1100	<.5	130	1600	1200	36
	Nov-09	7.02	mnt	mnt	34	1400	1400	90	160	1100	<.5	160	1500	1200	68

Well	Date Sampled	PH	Conductivity	Turbidity	Ammonia as Nitrogen	Total Alkalinity	CaC03	Calcium	Chloride	Hardness Cac03	Nitrate	Sodium	TDS	TFDS	Total Organic Carbon
MW-1 Shallow	Mar-01	7.19	2180	7.3	nd	1400	1400	120	200	1100	nd	230	1700	1400	11
	May-01	6.97	1940	na	nd	1400	1400	120	220	1100	nd	220	1800	1400	15
	Aug-01	7.1	1638	4.2	nd	1400	1400	130	220	1200	nd	240	1800	1400	10
	Feb-02	6.9	1322	6	nd	1100	1100	110	220	1000	nd	220	1700	1400	8.7
	Dec-02	7.17	1430	7	nd	1200	1200	120	190	1200	nd	250	1700	1400	8.9
	Jan-03	7.41	2396	10	nd	1300	1300	110	200	1000	nd	220	1700	1300	8.4
	May-04	7.06	2265	11	nd	1400	1400	120	190	1100	0.9	240	1700	1200	9.4
	Dec-04	6.89	3368	7	nd	1400	1400	130	190	1200	nd	240	1700	1300	9.9
	May-05	6.83	3109	7	nd	1500	1500	130	190	1200	nd	250	1600	1300	9.7
	Dec-05	8.49	2846	19	nd	1400	1400	76	240	1100	1	230	1700	1300	14
	May-06	7.63	2604	10	nd	1300	1300	110	230	970	1	220	1600	1500	4.2
	Dec-06	7.29	2605	8	nd	1400	1400	210	176	920	0.6	160	1700	1600	10
	May-07	7.41	2127	7.9	nd	1300	1300	120	180	1100	nd	220	1600	1500	72
	Nov-07	7.37	1870	4	nd	1200	1200	110	180	1100	3.8	230	1400	1200	80
	Jun-08	7.23	2500	5	<.1	1200	1200	110	160	930	2.2	210	1600	1200	43
	Dec-08	7	2860	6.2	<.1	1200	1200	110	150	1100	1.6	210	1500	1200	18
	Jun-09	mnt	mnt	mnt	<.1	1200	1200	99	160	950	1	160	1500	1200	29
	Nov-09	6.97	mnt	mnt	0.14	1300	1300	110	170	1100	1.9	220	1500	1100	62

Well	Date Sampled	PH	Conductivity	Turbidity	Ammonia as Nitrogen	Total Alkalinity	CaC03	Calcium	Chloride	Hardness Cac03	Nitrate	Sodium	TDS	TFDS	Total Organic Carbon
MW-1 Shallow	Mar-01	7.1	2141	7.2	nd	1300	1300	96	210	1000	nd	210	1700	1200	40
	May-01	6.88	1910	na	nd	1300	1300	97	190	250	nd	200	1700	1300	23
	Aug-01	7.03	1577	8.8	nd	1300	1300	110	200	1100	nd	220	1700	1100	22
	Feb-02	6.76	1250	18	nd	970	970	96	200	1000	nd	200	1600	1100	22
	Dec-02	7.12	1342	28	nd	1300	1300	100	180	1100	nd	220	1400	1100	23
	Jan-03	7.4	2341	22	nd	1300	1300	94	180	1000	nd	210	1600	1200	3.2
	Nov-03	7.4	1928	10.2	nd	1400	1400	100	190	1100	nd	140	1600	1200	20

	May-04	7.12	2228	14	nd	1400	1400	110	120	1200	0.4	220	1700	1100	17
	Dec-04	6.82	3348	4	nd	1400	1400	120	190	1300	nd	220	1600	1200	18
	May-05	6.83	3158	7	nd	1500	1500	110	190	1200	nd	230	1600	1200	18
	Dec-05	8.59	2830	22.1	nd	1400	1400	57	240	1000	1.2	220	1700	1400	23
	May-06	7.54	2692	4.8	nd	1400	1400	110	240	1100	1.1	210	1600	1500	43
	Dec-06	7.4	1920	12	nd	1400	1400	140	175	1600	0.6	320	1600	1600	20
	May-07	7.24	2075	32.89	nd	1400	1400	110	200	1400	nd	230	1600	1400	38
	Nov-07	7.31	1972	5	nd	1300	1300	110	180	1200	1	210	1500	1200	40
	Jun-08	7.51	2700	4	<.1	1200	1200	100	180	190	5.8	170	1500	1200	37
	Dec-08	6.89	3010	1.6	<.1	1200	1200	110	170	1200	1.6	190	1500	1200	23
	Jun-09	mnt	mnt	mnt	0.47	1300	1300	100	180	1000	2.9	160	1600	1200	16
	Nov-09	6.84	mnt	mnt	<.1	1200	1200	110	180	1200	3.7	200	1500	1200	75